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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/629,157	07/28/2003	Peter J. Black	020754	5981

23696 7590 09/12/2007

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EXAMINER	
WANG, TED M	

ART UNIT	PAPER NUMBER
2611	

NOTIFICATION DATE	DELIVERY MODE
09/12/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)
	10/629,157	BLACK ET AL.
	Examiner	Art Unit
	Ted M. Wang	2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 August 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13 and 15-33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13 and 15-33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, filed on 8/13/2007, with respect to claims 1-33 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-15, 16-26 and 30-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smee et al. (WO 02/09305) in view of Porter et al. (US 7,065,136) and Frank (US 2004/0042537).

- With regard claim 1, as shown in figure 3, Smee et al. discloses a method of receiving data in a wireless communication system, the method comprising:

  processing received signals through a RAKE processing element to generate RAKE processed signals (block 330 in figure, page 3, lines 16-20, note RAKE processing scheme is a second processing scheme);

  measuring a first quality metric of the RAKE processed signals (page 3, lines 16-20; page 5, lines 1-6);

Smee et al. do not explicitly teach comparing the first quality metric of the RAKE processed signals to a first threshold value, and when the first quality metric exceeds the first threshold value, enabling an equalizer to operate concurrently with rake processing element.

However, Porter et al. discloses comparing the first quality metric of the matched filter signals (as shown in Frank's reference, matched filter stage is called RAKE) to a threshold value, and when the quality metric exceeds the threshold value, enabling an equalizer to operate concurrently with rake processing element (Fig.11 element 153 and column 12 lines 23-51).

As common knowledge of one of ordinary skill in the art to include comparing the quality metric of the RAKE processed signals to a threshold value, and when the quality metric exceeds the threshold value, enabling an equalizer to reduce the effects of multipath. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include comparing the quality metric of the RAKE processed signals to a threshold value, and when the quality metric exceeds the threshold value, enabling an equalizer as taught by Porter et al. and Frank to the method as taught by Smee et al. so as to provide better quality of the communication system.

- With regard claim 2, Smee et al. further teach measuring a correction metric of the RAKE processed signals (page 30, lines 16-22; page 31, lines 1-2); and comparing the correction metric to a second threshold value (page 31, lines 1-4).

Smee et al., Porter et al., and Frank disclose all of the above subject matters and when the first quality metric exceeds the first threshold value, enabling an equalizer. Frank further teaches when the correction metric exceeds the threshold, the equalizer is used (page 2, paragraph [0022]; note: Frank recites that when the Doppler frequency exceeds the threshold, the output of the RAKE is used; otherwise, the output of the equalizer is used. As a common knowledge of one of ordinary skilled in the art that when the Doppler frequency is large, the fading is small and vice versa. Therefore, when the Doppler frequency is small, the fading is larger than a threshold (i.e. correction metric exceeds the threshold)); consequently, the equalizer is used (i.e. enabling the equalizer)).

It is desirable to include that when the first quality metric exceeds the first threshold value and when the correction metric exceeds the second threshold, enabling an equalizer to reduce the effect of multipath and fading. Therefore, it would have been obvious to one of ordinary skilled in the art at the time the invention was made to combine the teaching of Smee et al. and Porter et al. to the teaching of Frank so as to provide better performance of the communication system.

- With regard claim 3, Smee et al. further teach the first quality metric is a signal to noise ratio (page 30, lines 27-29).
- With regard claim 4, Smee et al. further teach the correction metric is a cross-correlation measure (page 15, lines 15-26).

- With regard claim 5, Smee et al. further teach the cross-correlation is measured between pilot bursts (page 15, lines 20-26).
- With regard claim 6, Smee et al. further teach measuring the first quality metric of the equalizer processed signals (page 30, lines 27-29);

  comparing the first quality metric of the equalizer processed signals to the first quality metric of the RAKE processed signals (page 30, lines 27-30); and

  when the first quality metric of the equalizer processed signals is less than the first quality metric of the RAKE processed signals disabling the equalizer (see also page 30, lines 27-30; note that when the quality metric of the equalizer is less than that of RAKE, the selector selects RAKE; therefore, it is obvious to disable the equalizer).
- With regard claim 7, as shown, in figure 3, Smee et al. disclose a method of receiving data in a wireless communication system, the method comprising:

  processing received signals through a RAKE processing element to generate RAKE processed signals (block 330 in figure 3, page 3, lines 16-20, note RAKE processing scheme is a second processing scheme); and

  periodically testing operating conditions by initiating a test mode once in a sample period (page 17, lines 17-19), comprising:

  processing received signals through an equalizer to generate equalizer processed signals (block 310 in figure 3; page 3, lines 13-16);

  measuring a first quality metric of the RAKE processed signals (page 3, lines 18-20; page 5, lines 1-6);

measuring the first quality metric of the equalizer processed signals (page 3, lines 18-20; page 4, lines 24-29);

comparing the first quality metric of the RAKE processed signals to the first quality metric of the equalizer processed signals (page 30, lines 27-30);

determining whether to enable the equalizer based on the comparison (page 30, lines 29-30, determining whether or not to select the equalizer is similar to determine whether or not to enable the equalizer).

It is inherent that the sample period is sufficient to allow data to traverse the filter elements of the equalizer because in order to measure the quality metric of the equalizer processed signals to compare with the quality metric of the RAKE processed signals, the sample period has to be sufficient to allow data has to pass through the equalizer.

Smee et al. do not explicitly teach comparing the first quality metric of the RAKE processed signals to a first threshold value, and when the first quality metric exceeds the first threshold value, enabling an equalizer to operate concurrently with rake processing element.

However, Porter et al. discloses comparing the first quality metric of the matched filter signals (as shown in Frank's reference, matched filter stage is called RAKE) to a threshold value, and when the quality metric exceeds the threshold value, enabling an equalizer to operate concurrently with rake processing element (Fig.11 element 153 and column 12 lines 23-51).

As common knowledge of one of ordinary skill in the art to include comparing the quality metric of the RAKE processed signals to a threshold value, and when the quality metric exceeds the threshold value, enabling an equalizer to reduce the effects of multipath. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include comparing the quality metric of the RAKE processed signals to a threshold value, and when the quality metric exceeds the threshold value, enabling an equalizer as taught by Porter et al. and Frank to the method as taught by Smee et al. so as to provide better quality of the communication system.

- With regard claim 8, Smee et al. further teach if the first quality metric of the RAKE processed signals exceeds the first quality metric of the equalizer processed signals by a margin amount, then determining whether to enable the equalizer based on the comparison comprises determining to disable the equalizer (page 30, lines 27-30; note that the selector select the signal processing path that provides better S/N; in this case, the selector will select RAKE processed signals; therefore, it is obvious to disable the equalizer).
- With regard claim 9, Smee et al. further teach if the first quality metric of the RAKE processed signals does not exceed the first quality metric of the equalizer processed signals by the margin amount, then determining whether to enable the equalizer based on the comparison comprises determining to enable the equalizer (page 30, lines 27-30; note that the selector select the signal

processing path that provides better S/N; in this case, the selector will select equalizer processed signals; therefore, it is obvious to enable the equalizer).

- With regard claim 10, Smee et al. further teach the first quality metric is a signal to interference and noise ratio (page 30, page 27-29).
- With regard claim 11, Smee et al. further teach when the equalizer is enabled, the method further comprises:

  terminating testing; processing received signals through the equalizer to generate equalizer processed signals (see block 310 in figure 3);

  measuring the first quality metric of the RAKE processed signals (page 29, lines 17-20);

  measuring the first quality metric of the equalizer processed signals (page 30, lines 25-27);

  comparing the first quality metric of the RAKE processed signals to the first quality metric of the equalizer processed signals and determining whether to disable the equalizer based on the comparison (page 30, lines 27-30).
- With regard claim 12, Smee et al. further teach if the first quality metric of the RAKE processed signals exceeds the first quality metric of the equalizer processed signals by a margin amount, then determining whether to enable the equalizer based on the comparison comprises determining to disable the equalizer (page 30, lines 27-30; note that the selector select the signal processing path that provides better S/N; in this case, the selector will select RAKE processed signals; therefore, it is obvious to disable the equalizer).

- With regard claim 13, Smee et al. further teach if the first quality metric of the RAKE processed signals does not exceed the first quality metric of the equalizer processed signals by the margin amount, then determining whether to enable the equalizer based on the comparison comprises determining to enable the equalizer (page 30, lines 27-30; note that the selector select the signal processing path that provides better S/N; in this case, the selector will select equalizer processed signals; therefore, it is obvious to enable the equalizer).
- With regard claim 15, which is a mean plus function claim related to claim 1, all limitation is contained in claim 1. The explanation of all the limitation is already addressed in the above paragraph.
- With regard claim 16, Smee et al., Frank and Porter et al. disclose all of the subject matter as described in claim 1 above, and Porter et al. further disclose processing element for processing computer-readable instructions and memory storage device adapted to store computer-readable instructions (column 5, lines 6-11).

  One skilled in the art would have clearly recognized that the method of Smee et al. would have included a memory storage to store computer-readable instructions. Therefore, it would have been obvious to include the memory storage as taught by Porter et al. to the method as taught Smee et al., Frank, and Porter et al. in order to provide more accuracy of the communication system.
- With regard claim 17, As shown in figure 3, Smee et al. disclose an apparatus for receiving data in a wireless communication system, the apparatus comprising:

means for processing received signals through a RAKE processing element to generate RAKE processed signals (block 330 in figure, page 3, lines 16-20, note RAKE processing scheme is a second processing scheme); and

means for periodically testing operating conditions (page 17, lines 17-19), comprising:

means for processing received signals through an equalizer to generate equalizer processed signals (block 310 in figure 3; page 3, lines 13-16);

means for measuring a first quality metric of the RAKE processed signals (page 3, lines 18-20; page 5, lines 1-6);

means for measuring the first quality metric of the equalizer processed signals (page 3, lines 18-20; page 4, lines 24-29);

means for comparing the first quality metric of the RAKE processed signals to the first quality metric of the equalizer processed signals (page 30, lines 27-30);

means for determining whether to enable the equalizer based on the comparison (page 30, lines 29-30, determining whether or not to select the equalizer is similar to determine whether or not to enable the equalizer).

Smee et al. do not explicitly teach comparing the first quality metric of the RAKE processed signals to a first threshold value, and when the first quality metric exceeds the first threshold value, enabling an equalizer to operate concurrently with rake processing element.

However, Porter et al. discloses comparing the first quality metric of the matched filter signals (as shown in Frank's reference, matched filter stage is called RAKE) to a threshold value, and when the quality metric exceeds the threshold value, enabling an equalizer to operate concurrently with rake processing element (Fig.11 element 153 and column 12 lines 23-51).

As common knowledge of one of ordinary skill in the art to include comparing the quality metric of the RAKE processed signals to a threshold value, and when the quality metric exceeds the threshold value, enabling an equalizer to reduce the effects of multipath. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include comparing the quality metric of the RAKE processed signals to a threshold value, and when the quality metric exceeds the threshold value, enabling an equalizer as taught by Porter et al. and Frank to the method as taught by Smee et al. so as to provide better quality of the communication system.

- With regard claim 18, Smee et al. disclose all of the subject matter as described in claim 7 above and further teach processing element for processing computer-readable instructions (page 32, lines 15-24). Smee et al. do not teach a memory storage device adapted to store computer-readable instructions.

However, Porter et al. disclose processing element for processing computer-readable instructions and memory storage device adapted to store computer-readable instructions (column 5, lines 6-11). One skilled in the art would have clearly recognized that the method of Smee et al. would have

included memory storage to store computer-readable instructions. Therefore, it would have been obvious to include the memory storage as taught by Porter et al. to the method as taught Smee et al. in order to provide more accuracy of the communication system.

- With regard claim 19, which is an apparatus claim related to claim 1, all limitation is contained in claim 1. The explanation of all the limitation is already addressed in the above paragraph.
- With regard claim 20, Porter et al. further disclose the controller (i.e. selector 50 in figures 3 and 4) enables the equalizer when a channel quality measure of the estimate (i.e. BER) is above a threshold (column 6, lines 6-55).

  One skilled in the art would have recognized that including the controller enables the equalizer when a channel quality measure of the estimate is above the threshold because an equalizer reduce the effects of multipath and BER. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to including the controller enables the equalizer when a channel quality measure of the estimate is above the threshold so as to provide better quality of the communication system.
- With regard claim 21, Smee et al. further disclose the equalizer is selected when a first correlation of the estimate is greater than a second correlation of an equalized estimate generated by the equalizer (page 31, lines 1-4).
- It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the equalizer is selected when a first correlation of

the estimate is greater than a second correlation of an equalized estimate generated by the equalizer to reduce the ISI due to multipath and channel distortion (page 3, lines 1-3). Therefore, it would have been obvious to one of ordinary skilled in the art at the time the invention was made to include the equalizer is selected when a first correlation of the estimate is greater than a second correlation of an equalized estimate generated by the equalizer as taught by Smee et al. to the system as taught by Ma et al. and Porter et al.

- With regard claim 22, Smee et al. further teach the first correlation and the second correlation are based on received pilot signals (page 30, lines 15-23).
- With regard claim 23, Smee et al. further teach the equalizer is disable (i.e. not selected) when a channel quality measure of the estimate from the RAKE receiver is greater than a channel quality measure of an equalized estimate generated by the equalizer (page 30, lines 27-30).
- With regard claims 24 and 25, Smee et al. further disclose the equalizer is periodically re-adapted (page 17, lines 17-19) to compare an equalized estimate generated by the equalizer to the estimate from the RAKE receiver (page 30, lines 27-30).
- With regard claim 26, Frank discloses the Doppler frequency of the equalizer (i.e. channel velocity of the equalized estimate) is compared with the Doppler frequency of the channel fading process (page 2, paragraph [0022]). Frank also teaches the comparison between the quality of the equalizer and the quality of the RAKE. Therefore, it would have been obvious to one of ordinary skilled in

the art to compare the Doppler frequency of the equalizer (i.e. channel velocity) to the estimate from RAKE receiver to improve channel estimation method that works satisfactorily under slow-to fast fading environments.

- With regard claims 30 and 31, Smee et al. further teach the apparatus has two operating modes, comprising: a mode wherein the RAKE receiver is enabled and the equalizer is disabled; a mode wherein the RAKE receiver and equalizer are enabled (see figure 3, page 9 lines 34-38; page 10, lines 1-30; page 30, lines 27-30; note that both RAKE and equalizer are enabled to process the signal, then after comparing, when the quality of RAKE process signal is larger then the quality of the equalizer process signal, the selector will select RAKE, i.e. RAKE is enable, the equalizer is disable).
- With regard claim 32, Smee et al. further teach a test mode wherein the equalizer is enabled for a sample period and an equalized estimate compared to the estimate from the RAKE receiver (page 30, lines 27-30; note that the equalizer is enable to process the signal, then use the equalized estimate to compared with the estimate from the RAKE).
- With regard claim 33, which is a method claim related to claim 1, all limitation is contained in claim 1. The explanation of all the limitation is already addressed in the above paragraph.

4. Claim 27-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smee et al. (WO 02/09305) in view of Porter et al. (US 7,065,136) and Frank (US 2004/0042537) and further in view of Cheng-Quispe et al. (Re. 33,380).

- With regard claim 27, Smee, Porter and Frank disclose all of the subject matters in claim 19 above except for the equalizer is adapted to operate in a first operating mode and in a second test mode when enabled.

  However, Cheng-Quispe et al. disclose the equalizer is adapted to operate in an operating mode and in a test mode (column 25, lines 22-49).

  It is desirable to include the equalizer is adapted to operate in an operating mode and in a test mode to retain the flexibility provided by a programmed processor (column 2, lines 36-38). Therefore, it would have been obvious to one of ordinary skilled in the art at the time the invention was made to include the equalizer is adapted to operate in an operating mode and in a test mode because it is relatively inexpensive updating of the data set design (column 3, lines 41-43).

- With regard claim 28, Smee et al. further disclose when a channel quality measure of an equalized estimate generated by the equalizer is greater than a channel quality measure of the estimate from the RAKE receiver, the equalizer is selected (i.e. the equalizer is in the operating mode) (page 30, lines 27-30).

- With regard claim 29, Smee et al. further teach the equalization controller disables the equalizer when a signal-to-noise ratio of the estimate from the RAKE receiver is greater than an equalized estimate from the equalizer (page 30, lines

27-30; note that when SNR of RAKE is greater than that of equalizer, RAKE is selected; therefore, it is obvious that the equalizer is disable).

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ted M. Wang whose telephone number is 571-272-3053. The examiner can normally be reached on M-F, 7:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571-272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ted M. Wang

Ted M Wang
Examiner
Art Unit 2611